# Condition of Lake Erie Largemouth Bass Sampled in the ODOW Nearshore Community Survey 2012-2016

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```
Cond <- read.csv("./Data/Raw-Data/2012-2016_nearshore-survey_largemouth-bass.csv") %>%
  mutate(logW=log10(Weight),logL=log10(Length))
Cond$fyr <- factor(Cond$Year)

str(Cond)
```

```
## 'data.frame':    496 obs. of  13 variables:
##  $ Year  : int  2012 2012 2012 2012 2012 2012 2012 2012 2012 2012 ...
##  $ Site  : int  18 18 18 18 18 18 18 18 18 18 ...
##  $ FID   : int  NA NA NA NA NA NA NA NA NA NA ...
##  $ Weight: num  8 10 10 30 25 20 40 155 145 170 ...
##  $ Length: int  72 82 85 108 110 115 119 220 220 230 ...
##  $ AC    : int  2 2 2 2 2 2 2 2 3 3 ...
##  $ AGE   : int  NA NA NA NA NA NA NA NA NA NA ...
##  $ SexCon: int  NA NA NA NA NA NA NA NA NA NA ...
##  $ Sex   : int  NA NA NA NA NA NA NA NA NA NA ...
##  $ Delts : logi  NA NA NA NA NA NA ...
##  $ logW  : num  0.903 1 1 1.477 1.398 ...
##  $ logL  : num  1.86 1.91 1.93 2.03 2.04 ...
##  $ fyr   : Factor w/ 5 levels "2012","2013",..: 1 1 1 1 1 1 1 1 1 1 ...
```

```
headtail(Cond)
```

```
##     Year Site FID Weight Length AC AGE SexCon Sex Delts     logW     logL
## 1   2012   18  NA      8     72  2  NA     NA  NA    NA 0.903090 1.857332
## 2   2012   18  NA     10     82  2  NA     NA  NA    NA 1.000000 1.913814
## 3   2012   18  NA     10     85  2  NA     NA  NA    NA 1.000000 1.929419
## 494 2016   18  11   1131    409  3   4      8   2    NA 3.053463 2.611723
## 495 2016   18  10   1258    423  3   8      8   2    NA 3.099681 2.626340
## 496 2016   18  24   1312    431  3   6      8   2    NA 3.117934 2.634477
##      fyr
## 1   2012
## 2   2012
## 3   2012
## 494 2016
## 495 2016
## 496 2016
```

```
(wsLMB <- wsVal("Largemouth Bass", simplify = TRUE))
```

```
##            species min.TL    int slope
## 76 Largemouth Bass    150 -5.528 3.273
```

```
(wsLMB_min <- wsLMB[["min.TL"]])
```

```
## [1] 150
```

```
(wsLMB_int <- wsLMB[["int"]])
```

```
## [1] -5.528
```

```
(wsLMB_slp <- wsLMB[["slope"]])
```

```
## [1] 3.273
```

```
Cond %<>% mutate(Ws = 10^(wsLMB_int+wsLMB_slp*logL),
                 Wr=(Weight/Ws)*100)
headtail(Cond[,c(1,3,14,15)])
```

```
##     Year FID          Ws       Wr
## 1   2012  NA    3.556717 224.9266
## 2   2012  NA    5.443933 183.6907
## 3   2012  NA    6.123337 163.3097
## 494 2016  11 1047.539449 107.9673
## 495 2016  10 1169.531766 107.5644
## 496 2016  24 1243.495177 105.5091
```

```
headtail(Cond[Cond$Year==2013,]) ### No Wr for 2013
```

```
##     Year Site FID Weight Length AC AGE SexCon Sex Delts logW     logL  fyr
## 29  2013    8  55     NA    146 NA   1      6   2    NA   NA 2.164353 2013
## 30  2013    2  77     NA    154 NA   1      1   1    NA   NA 2.187521 2013
## 31  2013    2  78     NA    159 NA   1      6   2    NA   NA 2.201397 2013
## 140 2013   15 180     NA    411 NA   5      8   2    NA   NA 2.613842 2013
## 141 2013   18 139     NA    422 NA   3      8   2    NA   NA 2.625312 2013
## 142 2013   11   8     NA    426 NA   3      3   1    NA   NA 2.629410 2013
##              Ws Wr
## 29    35.96888 NA
## 30    42.83071 NA
## 31    47.55244 NA
## 140 1064.39857 NA
## 141 1160.50670 NA
## 142 1196.89931 NA
```

```
Stock <- Cond %>%
  filter(Length>=200) %>%
  mutate(gcat=lencat(Length, breaks = psdVal("Largemouth Bass"),
                     use.names = TRUE)) %>%  ### create Gabelhouse Length Categories
  filterD(!is.na(Wr))                        ### Remove 2013 b/c no Wr Data
headtail(Stock[,c(1,3,14:16)])
```

```
##     Year FID        Ws       Wr      gcat
## 1   2012  NA  137.6415 112.6114     stock
## 2   2012  NA  137.6415 105.3461     stock
## 3   2012  NA  159.1971 106.7859     stock
## 333 2016  11 1047.5394 107.9673 preferred
## 334 2016  10 1169.5318 107.5644 preferred
## 335 2016  24 1243.4952 105.5091 preferred
```

```
#write.csv(Stock,file="Data/Clean-Data/2012-2016_nearshore-survey-largemouth-bass_CLEAN.csv")
```

Created Clean data sile with the Wr standard weight and gabelhouse length category for stock length individuals from 20122014,2015, and 2016. The file name is 2012-2016_nearshore-survey-largemouth-bass_CLEAN.csv.

```
Summarize(Wr~fyr, data=Stock, digits = 0) ### Wr Weight by Year
```

```
##    fyr   n mean sd min  Q1 median  Q3 max
## 1 2012  21  108  8  93 104    106 113 124
## 2 2014 140  110 16  80  99    107 118 151
## 3 2015  67  110 16  78  98    109 121 150
## 4 2016 107  115 14  62 108    115 125 146
```

```
(Wr_fyr.gcat <- Summarize(Wr~fyr*gcat, data=Stock))
```

```
##     fyr      gcat  n      mean        sd    min     Q1 median    Q3   max
## 1  2012     stock  3 108.24778  3.846934 105.30 106.10 106.80 109.7 112.6
## 2  2014     stock 65 118.27433 15.782376  88.74 106.70 116.10 127.5 151.3
## 3  2015     stock 14 124.89321 12.477382 103.90 116.60 123.70 133.8 149.7
## 4  2016     stock 52 120.60206 12.540774  68.71 113.90 121.60 127.1 144.9
## 5  2012   quality  8 111.48824  7.107669 101.20 105.70 112.30 115.7 121.5
## 6  2014   quality 57 103.51170 11.643284  80.40  96.07 102.20 111.6 133.1
## 7  2015   quality 38 109.32674 12.928592  84.07 100.80 108.20 120.5 131.1
## 8  2016   quality 44 111.22398 14.357351  61.76 105.50 110.50 118.9 146.2
## 9  2012 preferred 10 104.33279  9.184145  93.08  97.87 104.40 107.0 124.5
## 10 2014 preferred 18  97.67045  8.942296  83.65  90.40  98.58 103.0 115.5
## 11 2015 preferred 15  97.08404 12.438525  78.24  86.02  96.65 105.6 119.8
## 12 2016 preferred 11 107.37315  6.899718  94.36 103.90 107.60 111.6 118.9
```

```
str(Wr_fyr.gcat)
```

```
## 'data.frame':    12 obs. of  10 variables:
##  $ fyr   : Factor w/ 4 levels "2012","2014",..: 1 2 3 4 1 2 3 4 1 2 ...
##  $ gcat  : Factor w/ 3 levels "preferred","quality",..: 3 3 3 3 2 2 2 2 1 1 ...
##  $ n     : num  3 65 14 52 8 57 38 44 10 18 ...
##  $ mean  : num  108 118 125 121 111 ...
##  $ sd    : num  3.85 15.78 12.48 12.54 7.11 ...
##  $ min   : num  105.3 88.7 103.9 68.7 101.2 ...
##  $ Q1    : num  106 107 117 114 106 ...
##  $ median: num  107 116 124 122 112 ...
##  $ Q3    : num  110 128 134 127 116 ...
##  $ max   : num  113 151 150 145 122 ...
```

```
#write.csv(Wr_fyr.gcat,file = "Data/Clean-Data/relative-weight.csv")
```

I have created a file with the relative weight of each gabelhouse length category for each year. The file name is relative-weight.csv.

### The Steps Below are no longer necessary

The next step is to get a summary of the relative weight for each gabel house length categoriy and year. Really All I am Interested in is the Wr weight for Quality and Preferred length individuals. So I will just seperate these out I think.

```
Pref <- filterD(Stock,gcat=="preferred")
str(Pref)
```

```
## 'data.frame':    54 obs. of  16 variables:
##  $ Year  : int  2012 2012 2012 2012 2012 2012 2012 2012 2012 2012 ...
##  $ Site  : int  18 18 18 18 18 18 18 18 18 18 ...
##  $ FID   : int  NA NA NA NA NA NA NA NA NA NA ...
```

```
##  $ Weight: num  800 850 970 940 1090 1100 1150 1150 1400 1320 ...
##  $ Length: int  385 388 393 403 405 410 415 418 418 425 ...
##  $ AC    : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ AGE   : int  NA NA NA NA NA NA NA NA NA NA ...
##  $ SexCon: int  NA NA NA NA NA NA NA NA NA NA ...
##  $ Sex   : int  NA NA NA NA NA NA NA NA NA NA ...
##  $ Delts : logi  NA NA NA NA NA NA ...
##  $ logW  : num  2.9 2.93 2.99 2.97 3.04 ...
##  $ logL  : num  2.59 2.59 2.59 2.61 2.61 ...
##  $ fyr   : Factor w/ 4 levels "2012","2014",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ Ws    : num  859 882 919 998 1014 ...
##  $ Wr    : num  93.1 96.4 105.5 94.2 107.5 ...
##  $ gcat  : Factor w/ 1 level "preferred": 1 1 1 1 1 1 1 1 1 1 ...
```

```
(Wr_Pref <- Summarize(Wr~fyr,data = Pref))
```

```
##    fyr  n      mean        sd   min     Q1 median    Q3   max
## 1 2012 10 104.33279  9.184145 93.08  97.87 104.40 107.0 124.5
## 2 2014 18  97.67045  8.942296 83.65  90.40  98.58 103.0 115.5
## 3 2015 15  97.08404 12.438525 78.24  86.02  96.65 105.6 119.8
## 4 2016 11 107.37315  6.899718 94.36 103.90 107.60 111.6 118.9
```

```
str(Wr_Pref)
```

```
## 'data.frame':    4 obs. of  9 variables:
##  $ fyr   : Factor w/ 4 levels "2012","2014",..: 1 2 3 4
##  $ n     : num  10 18 15 11
##  $ mean  : num  104.3 97.7 97.1 107.4
##  $ sd    : num  9.18 8.94 12.44 6.9
##  $ min   : num  93.1 83.7 78.2 94.4
##  $ Q1    : num  97.9 90.4 86 103.9
##  $ median: num  104.4 98.6 96.7 107.6
##  $ Q3    : num  107 103 106 112
##  $ max   : num  124 116 120 119
```

```
#write.csv(Wr_Pref,file = "Data/Clean-Data/preferred-length_relative-weight.csv")
```

```
Qual <- filterD(Stock,gcat=="quality")
str(Qual)
```

```
## 'data.frame':    147 obs. of  16 variables:
##  $ Year  : int  2012 2012 2012 2012 2012 2012 2012 2012 2014 2014 ...
##  $ Site  : int  18 18 18 18 18 18 18 18 15 2 ...
##  $ FID   : int  NA NA NA NA NA NA NA NA NA NA ...
##  $ Weight: num  700 850 750 850 800 950 850 900 454 511 ...
##  $ Length: int  347 364 368 368 371 374 377 379 300 301 ...
##  $ AC    : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ AGE   : int  NA NA NA NA NA NA NA NA NA NA ...
##  $ SexCon: int  NA NA NA NA NA NA NA NA NA NA ...
##  $ Sex   : int  NA NA NA NA NA NA NA NA NA NA ...
##  $ Delts : logi  NA NA NA NA NA NA ...
##  $ logW  : num  2.85 2.93 2.88 2.93 2.9 ...
##  $ logL  : num  2.54 2.56 2.57 2.57 2.57 ...
##  $ fyr   : Factor w/ 4 levels "2012","2014",..: 1 1 1 1 1 1 1 1 2 2 ...
##  $ Ws    : num  612 715 741 741 761 ...
##  $ Wr    : num  114 119 101 115 105 ...
```

```
##  $ gcat  : Factor w/ 1 level "quality": 1 1 1 1 1 1 1 1 1 1 ...
```

```
(Wr_Qual <- Summarize(Wr~fyr,data = Qual))
```

```
##    fyr  n     mean        sd    min     Q1 median    Q3   max
## 1 2012  8 111.4882  7.107669 101.20 105.70  112.3 115.7 121.5
## 2 2014 57 103.5117 11.643284  80.40  96.07  102.2 111.6 133.1
## 3 2015 38 109.3267 12.928592  84.07 100.80  108.2 120.5 131.1
## 4 2016 44 111.2240 14.357351  61.76 105.50  110.5 118.9 146.2
```

```
str(Wr_Qual)
```

```
## 'data.frame':    4 obs. of  9 variables:
##  $ fyr   : Factor w/ 4 levels "2012","2014",..: 1 2 3 4
##  $ n     : num  8 57 38 44
##  $ mean  : num  111 104 109 111
##  $ sd    : num  7.11 11.64 12.93 14.36
##  $ min   : num  101.2 80.4 84.1 61.8
##  $ Q1    : num  105.7 96.1 100.8 105.5
##  $ median: num  112 102 108 110
##  $ Q3    : num  116 112 120 119
##  $ max   : num  122 133 131 146
```

```
#write.csv(Wr_Qual,file = "Data/Clean-Data/quality-length_relative-weight.csv")
```